Executive Summary

California has been in a drought for several years, and it is expected that traditional sources of water will remain constrained even after its inevitable conclusion. Additional water supplies will come from non-traditional sources, including conservation, recycling, and desalination. Some additional supplies for urban consumption are coming from reallocation of water previously used for other purposes. And additional supplies may come from new sources or methods that are still in development and have not been commercialized, such as capture from the air. It is expected that all these additional water supplies will cost more than traditional water supplies.

This paper provides nearly 20 examples of the costs of various sources of water, including examples from such traditional sources as the State Water Project and from the latest updates on San Diego County's desalination project. The costs range from as little as $25/Acre-Foot[1] for certain water from the US Bureau of Reclamation to recycling and desalination projects with projected costs greater than $5,000/Acre-Foot. The extremes are misleading. By looking at several examples and by taking averages, it is possible to see the pattern: Although even some traditional sources of water are now priced above $1,000/Acre-Foot, clearly, the new sources are more expensive, quite a bit more expensive. The Summary Table below shows that, compared to the average among a few examples of traditional sources of water, the process of conserving water is about two-thirds more expensive, about $1,300 compared to about $800. Recycling water is nearly four times as costly as traditional sources of water. And desalination, seen in the few examples in our state, is more than four times the cost of traditional sources. Of course, that is to be expected, for if the new sources were less expensive, then we would be rushing to them first instead of examining them carefully for potential future use.

Summary Table - New Sources are Generally More Expensive than Traditional Sources

	Traditional Sources	Conservation	Recycling	Desalination
Lowest Cost Example	$25	$137	$396	$2,367
Average of Examples	$793	$1,335	$2,869	$3,389
Highest Cost Example	$1,456	$4,580	$5,800	$5,100

Dollars Per Acre-Foot

The paper also presents information about provision of urban water from agricultural land management and water-use efficiencies. Finally possible future sources of water are discussed briefly, including harvesting it from air. Those sources may or may not be feasible in the future.

The overall finding is one of higher costs for new sources of water. Even though the bulk of water delivered to customers comes from traditional sources, water utilities will have to rely increasingly on new sources in the future. The cost of water from those new water sources, including conservation as

[1] An Acre-Foot is the amount of water required to cover an acre of ground to a depth of one foot. It is equal to 43,560 cubic feet or 325,851 gallons.

well as recycling and desalination, is higher than the cost from traditional sources. The inevitable result is that the overall cost of water will be rising in the future. We should expect water rates to rise in the future as well.

Introduction

California has been in a drought for several years, and it is expected that traditional sources of water will remain constrained even if our current drought is eased by plentiful rain in this upcoming winter of El-Nino. On November 13, Governor Brown issued an executive order that calls for additional actions to build on the state's ongoing response to record dry conditions and assist in recovery efforts from this year's devastating wildfires.[2]

California's State Water Resources Control Board (SWRCB) has issued many curtailment notices, and maintains a place on its web page under "Water Issues."[3] Californians have valiantly cut back on the use of water at their homes.[4] The latest California Water Boards Fact Sheet indicates that "residential gallons per capita per day" is trending downward to an average of 97.3 in September, with an overall savings rate of 26.1-percent.[5] It is likely that our current drought will one day end. Even so, there have been long periods of drought in the past, and we need to be prepared for long and continuing droughts in the future.[6]

In the future, Californians will continue to find new ways to use less water, and we will continue to rely on our traditional sources of water for the bulk of our usage. But Californians are also looking for new solutions, not only to the current drought, but to protect ourselves for the future. For that, we are looking to new sources of supply to meet our needs. Unfortunately, new sources come with heavy price tags.

This paper is an informational document that provides a comparison among the costs of a few selected new water sources. Production costs for new water generally exceed the costs of existing traditional supplies, such as traditional ground-water pumping or surface water. Numbers presented in this paper are general and not specific to any particular part of California or to any specific project. This paper compares the cost of water from our traditional sources to three new, or non-traditional, sources: Freed-up supplies from Conservation/efficiency actions; Water produced from recovery; and Desalination. Each of these sources comes at a cost that is higher than the cost of traditional sources.

- In this document water production costs are denominated in ***dollars per acre-foot***, a measure often used in wholesale transactions in the United States. An Acre-foot is the amount of water

[2] State of California Executive Order B-36-15. The announcement is on the Governor's web site here. The Governor's web site is https://www.gov.ca.gov/home.php.
[3] State Water Resources Control Board. The home page is: http://www.waterboards.ca.gov/ The notices for the 2015 water year are shown here.
[4] The State Water Resources Control Board maintains a web page called the Water Conservation Portal.
[5] California Water Boards Fact Sheet, "September 2015 Statewide Conservation Data," October 29, 2015.
[6] California Department of Water Resources, California's Most Significant Droughts: Comparing Historical and Recent Conditions, February 2015.